

Notice of Allowability

Application No.

09/899,430

Examiner

Krista M. Flanagan

Applicant(s)

NIELSEN, GERT LYNGE

Art Unit

2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 31 January 2005.
2. ☒ The allowed claim(s) is/are 1-19.
3. ☒ The drawings filed on 31 January 2005 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER

DETAILED ACTION

Drawings

1. In view of the amendment filed on 31 January 2005, the Examiner withdraws objections to the drawings from the previous Office Action.

Response to Arguments

2. Applicant's arguments, see pages 10-17, filed 31 January 2005, with respect to claims 1, 3, 4, 6-9, 11 and 13-20 have been fully considered and are persuasive. The rejection of the claims has been withdrawn.
3. Applicant's arguments, see pages 19, filed 31 January 2005, with respect to claims 2, 5 and 12 have been fully considered and are persuasive. The rejection of the claims has been withdrawn.

Allowable Subject Matter

4. Claims 1 and 3-20 are allowed.
5. The following is an examiner's statement of reasons for allowance:
6. Referring to claim 1, prior art fails to teach (the bolded items) a frequency converter for shifting the frequency of an input signal by a desired frequency, the frequency converter comprising: first oscillator means for producing a first signal at a first frequency **and configured to receive an external reference frequency signal, the first signal derived with reference to the external reference frequency signal**; second oscillator means for producing a second signal at a second frequency **also configured to receive the external reference frequency signal, the second signal derived with reference to the external reference frequency signal**; frequency conversion means for converting the frequency of the input signal equal to a frequency

Art Unit: 2631

difference of the first signal and the second signal; and mixing means for mixing said first signal and said second signal to produce a frequency difference signal representative of the frequency difference between the first and second signals; and sampling means for sampling the frequency difference signal with a synthesized reference signal **derived from the external reference signal** such that aliasing results in an error signal corresponding to a frequency difference between the difference signal and a desired frequency shift, said the sampling means is configured to derive the synthesized reference signal from the external reference signal; one of said first oscillator means and second oscillator means being responsive to the error signal to adjust the frequency of the first signal and second signal, respectively.

7. Referring to claim 10, prior art fails to teach (the bolded items) a frequency converter for shifting the frequency of an input signal by a desired frequency, and that receives an external reference frequency signal, the frequency converter comprising: **a first oscillator that receives the external reference frequency signal and that produces a first signal at a first frequency; a second oscillator, responsive to a error signal, that receives the external reference frequency signal and that produces a second signal at a second frequency**, the input signal being shifted in frequency by the difference between the first frequency and the second frequency; in combination with: a difference circuit, comprising a difference mixer and a difference low pass filter, the difference mixer receiving the first signal and the second signal and producing a mixed signal, and the difference low pass filter filtering the mixed signal to produce a difference signal; a pulse train generator that receives the external reference frequency signal and that generates a pulse train signal with a harmonic at the desired frequency; and a

Art Unit: 2631

sampler circuit for receiving the pulse train signal and the difference signal to produce the error signal.

8. Referring to claim 15, prior art fails to teach (the bolded items) a transmitter for transmitting orthogonal frequency division modulated (OFDM) signals, comprising: an OFDM transmission engine configured to accept a digital input signal and modulate the input signal onto a plurality of orthogonal carriers to produce a baseband OFDM signal; an intermediate frequency converter configured to accept the baseband OFDM signal as input and shift it to an intermediate frequency signal; and an RF frequency upconverter for shifting the intermediate frequency (IF) signal by a desired frequency to an RF transmission frequency, including: a pair of frequency synthesizers for generating, based on an external frequency reference, signals having a frequency difference there between; a converter for shifting the frequency of the IF signal by an amount corresponding to the frequency difference of the signals from the pair of frequency synthesizers; **a reference signal generator for generating, based on the external reference signal, an internal reference signal having a harmonic at a frequency corresponding to the desired frequency**; a sampler for sampling a frequency difference signal corresponding to the frequency difference of the signals from the pair of frequency synthesizers with the internal reference signal to produce an error signal corresponding to the difference between the frequency difference signal and the desired frequency; **one of said frequency synthesizers being responsive to the error signal to adjust the frequency of the signal generated thereby to compensate for the difference between the frequency difference signal and the desired frequency.**

9. Referring to claim 18, prior art fails to teach (the bolded items) a frequency conversion method, for shifting the frequency of an input signal by a desired frequency, comprising the steps

Art Unit: 2631

of: generating a first signal at a first frequency; generating a second signal at a second frequency; mixing the input signal with said first signal to produce a shifted signal; mixing said shifted signal with said second signal to produce an output signal; mixing said first signal and said second signal to produce a difference signal; **comparing said difference signal with a pulse train signal, said pulse train signal having a harmonic corresponding to the desired frequency, producing, through aliasing, a low frequency error signal corresponding to the difference between said difference signal and the harmonic of said pulse train signal;** and adjusting the frequency of one of said first signal and said second said second signal in response to said error signal.

10. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krista M. Flanagan whose telephone number is (571) 272-2203.

The examiner can normally be reached on Monday - Friday, 8 - 4:30.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert J. Pascal can be reached on (571) 272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

Art Unit: 2631

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K. Flanagan
20050707